Appendix F

Groundwater Monitoring and Mitigation Plan

Everett Delta Lateral Project
Northwest Pipeline Corporation
Groundwater Monitoring and Mitigation Plan

The groundwater monitoring and mitigation plan for the Everett Delta Lateral Project consists of four phases, including identification of groundwater resources, determination of susceptibility to impacts, monitoring and mitigation. The following provides a discussion of each phase of the plan.

Phase I - Identification of Groundwater Resources

Initial identification of groundwater resources is complete. Initial identification included communications with state, county and local agencies and searches of a groundwater well database maintained by the Washington Department of Ecology. General locations of known or potential resources have been identified.

Final identification and confirmation of the existence and locations of groundwater resources and identification of additional resources will be conducted through field investigations and contacts with landowners within the pipeline corridor prior to construction. Landowners will be supplied with documentation explaining the field investigation, the pipeline construction, and potential impacts on groundwater resources. The documentation will also indicate how the landowner may contact Northwest Pipeline Corporation (Northwest) if further information is required.

Landowners will be asked to identify locations of groundwater supply wells and springs and seeps on their land or in the vicinity. Groundwater wells will be identified as domestic (municipal or self-supplied), irrigation, industrial, or livestock. Ownership of supply wells and springs and seeps will be identified. If ownership cannot be determined in the field, appropriate agency records will be reviewed in an effort to determine ownership.

Phase II - Determination of Susceptibility to Impacts

Private groundwater supply wells and springs and seeps within 200 feet (within 400 feet for public water supplies) of the pipeline construction right-of-way or temporary extra work areas will be considered potentially susceptible to impacts. These groundwater resources will be included in the monitoring program. Additionally, potentially impacted groundwater resources beyond the distances mentioned above will also be monitored if unique construction activities are required in the area.

Phase III - Monitoring

Groundwater Supply Wells

Owners of wells potentially susceptible to impacts will be advised that pre-construction monitoring is recommended to establish baseline water quality and yield data. Well owners will be asked whether they are agreeable to testing of the well (pump tested and sampled). The owner will be informed of what the monitoring involves, and asked to sign a monitoring agreement to permit or waive the testing. The monitoring agreement form will acknowledge that it will not prejudice the owner's right to pursue claims against actual damages if he/she elects to disallow monitoring, but will advise that the burden of proof of damage will lie with the well

owner. Actual pre-construction monitoring of the well may be implemented upon this initial contact with the landowner if he/she is agreeable. Or, the owner will be notified later of the proposed pre-construction monitoring schedule and asked to negotiate adjustments to the schedule where necessary.

Well testing personnel will accede to the requests of owners so far as possible in scheduling, test methods, and minimizing disturbance to wells, except that testing should satisfy the monitoring requirements where possible. The condition of the well will be determined prior to testing to determine if testing can be carried out without damage to the existing well. In the event that a well cannot practically be tested within the required schedule, a contingency agreement with the owner will be negotiated.

Wells for which owner approval has been obtained for monitoring will receive pre-construction checks of water quality and yield to determine if damages are caused by construction. Monitoring is intended to evaluate whether actual mechanical damage has occurred to the wellhead or the well's near-surface facilities, or if damage has occurred to the producing aquifer. Many wells have sealed wellheads and require the owner's cooperation in obtaining access for monitoring.

Monitoring will be conducted on each well using the well's own fitted pump and discharge line where possible. A submersible pump and portable generator will be used to test and sample wells not fitted with operating pumps at the time of testing. Where there is a non-operating pump obstructing access to a well, the owner's permission will be obtained and the wellhead and pump will be opened up to the extent required to allow a submersible pump to be set to test the well. Following testing, the well will be restored to its pretest condition, unless the owner requests otherwise (for example, that a non-operation pump should not be reinstalled).

Parameters measured or recorded in pre- and post-construction monitoring will include the following:

- water level or flow rate
- horsepower of the existing pump
- estimated aquifer transmissivity
- specific conductance
- temperature
- pH
- turbidity
- nitrate
- fecal coliform; and
- TPH – total petroleum hydrocarbons.

The owner will be asked to provide some preliminary well performance data that will be used to determine which hydraulic testing techniques are applicable. Water levels will be measured with an electric sounder. Where possible, stepped pump tests will be performed for short durations using the existing pump to calculated specific capacity, and estimate transmissivity.

A sample will be collected through the normal well discharge point and analyzed for the indicated parameters. Nitrate will be measured with specific ion electrodes. Upon completion of pre-construction monitoring, the owner will be provided with a point of contact with Northwest in

order to report potential impacts on wells or springs and seeps believed to be the result of construction.

Springs and Seeps

Where natural springs or seeps are located within 200 feet of the construction right-of-way, interviews with the landowners will be conducted. At that time, the spring's or seep's significance to fisheries of special concern will be determined. For each spring determined to have fisheries of special concern, the following data will be recorded:

- flow
- turbidity
- pH
- fecal coliform
- nitrate
- source location
- proximity to other sources (and presence of intervening fences, roads, or other barriers); and
- other pertinent information (fisheries significance, historic, local comments)

The spring and seep survey will also function as the first phase of impact monitoring. Spring surveys will be repeated after construction of the pipeline segment has been completed. Where there is doubt as to whether apparent variation, such as diminishment of flow, is due to construction impacts or to seasonal effects, follow-up surveys may be recommended at an appropriate season.

Phase IV - Mitigation of Supply Wells, Springs, and Seeps

If, upon completion of construction, well owners contact Northwest alleging an impact, post-construction monitoring will be conducted. Post-construction monitoring will be conducted in the same manner as pre-construction monitoring. Following post-construction monitoring, potential impacts will be evaluated based on comparisons with pre-construction monitoring data.

Where damage is reported or observed, the owner will be contacted in order to negotiate rehabilitation, replacement, or compensation. Mitigation measures for wells and springs and seeps will be specific to each, based on negotiations. Potable water will be provided to replace damaged potable supply wells until mitigation measures can be implemented. Rehabilitation may involve deepening an existing well. A replacement well may be drilled if an existing well cannot be suitably rehabilitated. A replacement well may have to be drilled at some distance from the original well to ensure adequate supply and the water may have to be piped to the location of the original well; however, no case is envisioned where it will be technically impossible to install a replacement well at some distance from the original well. Compensation will be the direct result of negotiations between Northwest and the individual well owner.